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BY

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NEW YORK CITY

(Read before the Middlesex County Medical Society
of New Jersey, October 18, 1911)

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CAUSES OF POST-OPERATIVE COMPLICATIONS AND EARLY VOLUNTARY MUSCULAR MOVEMENTS WITH AVOIDANCE OF THE USUAL CONFINEMENT TO BED AS A MEANS OF COMBATING THEM.*

By WATERS F. BURROWS, M.D.,

NEW YORK CITY.

THE customs necessitated by operative procedures in days preceding aseptic surgery and carried out by the pioneers in early modern surgical work still have a marked influence in many spheres upon the operator. Not only is conservatism in progress the rule among us but through lack of proper facilities for experimentation and time for thoughtful consideration of the ever broadening and rapidly changing problems in our profession, many there are who have found it advisable to continue with methods that have stood the test of time even though they have had disagreeable sequelæ with perchance an accompanying though small mortality. It may be that such mishaps have been deemed as never entirely avoidable but such a state of mind readily leads to a condition of self satisfaction

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which is not conducive to advancement toward more uniform and simple procedures which must finally result for the attainment of conditions most beneficial to the patient who it is attempted to relieve.

It is not, however, for the purpose of advocating less conservative operative work, rather the contrary, the abatement of many procedures unindicated and accompanied often by grave complications, that the post-operative treatment here advanced is called to your attention. For it is only in cases where from prolonged acquaintance with the operative technic from primary incision, through remedial measures performed, to closure of the wound, with simplification of the process and avoidance of unnecessary traumatizing and time consuming theoretical steps, purely visionary in value when tested by the rule as to whether or not they *assist* nature, that procedures such as are here advised are feasible.

The post-operative sequelæ some of which we have all observed in our work can be but alluded to here. However, the more common may be mentioned and are discomfort, if not actual pain, bronchitis, pneumonia, pleurisy, shock, hysteria, neurasthenia, insanity, urinary retention, cystitis, nephritis, acidosis, infection, hemorrhage, thrombosis and embolism, tympanities, vomiting, acute dilatation of the stomach, constipation, intestinal toxemia and slow recuperation.

In the prevention of complications it is of the greatest importance to bear in mind three objects. *First*, the correction or elimination as far as possible of diseased conditions in the circulatory, respiratory, nervous, gastro-

intestinal or excretory systems. *Second*, the removal of poisons already in the body as the result of disease in these parts and the minimum introduction and early destruction of deleterious substances as anesthetic, drugs, and the waste products of operative work. *Third*, the control of arterial tension which will result in a proper supply of rich aerated blood, rapid repair and the elimination of harmful products.

The *first* is in many cases impossible of attainment but with a knowledge of the presence of pathologic states, the fulfillment of the second and third indications is all the more urgent and the prognosis can be more clearly discerned. However, irritations and acute conditions can be corrected and even interstitial changes and the consequences of arteriosclerotic processes can be benefited.

The *second* object is also one of great importance but through means of cathartics, preparation of the patient for operation, the use of minimum amounts of the anesthetic and other commonly carried out procedures it is usually obtained.

The *third* goal of our endeavor, control of arterial tension, is a factor that seems in a large measure to have escaped the attention it demands and by way of exclusion the inference is strong that it is here will find causes for some of the more explicable post-operative complications such as infection, poor recuperation, discomfort and pain, peritoneal adhesions, tympanities, vomiting, constipation, diarrhea, bronchitis, pneumonia, oedema of the lungs, cystitis, urinary retention, hepatic and nephritic insufficiencies, hysteria and neurasthenia,

autoinfection and asthenia, as well as others of a more inexplicable etiology and more serious portend such as thrombosis and embolism.

Bearing upon this important subject, the researches of Lowsley are of interest. He found that blood pressure and the pulse rate were usually increased during exercise and that after exercise a period of reaction sets in during which there is a sub-normal pressure, greater or less marked according as to whether the exercise is more or less exhausting. He believes if this negative phase persists for more than two hours the margin of safety has been exceeded. As a matter of fact when the subject is in good physical condition he obtains what athletes call his "second wind", which means nothing more than the correlation of the blood pressure, rate of flow and distribution to the required degree of oxygenation, transformation of waste products, and their excretion, and under these circumstances the negative phase is comparatively short. Moreover, provided suitable exercises are prescribed and massage and stimulating baths given, this stage may be nearly eliminated.

On the other hand Edgecombe has shown that individuals with low blood pressure are subjects with poor circulation, cold hands and feet. He believes that it is the extreme feebleness of the circulation that gives rise to the subjective sensation of intense fatigue and this is corroborated by the fact that with a rise of pressure there is an almost invariable improvement in the subjective feelings and of the neurasthenic or other symptoms present.

Considering the question of blood pressure relative to more or less prolonged rest, as il-

lustrated in those who take to their bed for minor ailments, we find that there is a rapid loss of strength, arterial pressure soon drops with the changing from the upright to the prone position and quickly goes still lower when the latter is maintained, appetite is lessened, intestinal functions become sluggish with resulting tympanities and constipation, urination is more difficult, hypostatic congestion of the lungs is not infrequent and in general a formerly healthy individual becomes weakened, the abdominal muscles flaccid, normal vasomotor tone lost for a considerable period and convalescence is much delayed, even when the subject has remained in bed for as short a time as 48 to 72 hours. These patients are unable after this comparatively brief interval of complete rest to get up and maintain an upright position without experiencing faintness or syncope and other signs of cerebral anemia, which follow when arterial tone is lowered and the blood under the influence of gravity distends dependent vessels leaving important centers in the medulla without a sufficient supply.

In the aged and in those suffering from severe symptoms of absorption and poisoning, whether urinary from accompanying cystitis or of gastro-intestinal origin, attended with the train of nervous phenomena closely related to it, or from other source, operative work has been associated with great risks as to life, and many of these subjects with apparently no resistance die of a toxic overwhelming. The institution of the semi-recumbent position or one constantly changing has been followed by increased comfort, fewer lung complications,

greater vitality, a more rapid convalescence, and lessened mortality, but these facts have failed to influence the trend of surgical thought to the extent their importance demands. We still see patients lying in bed for a much longer time than necessary, double and often triple the time required, upon no rational basis we will find if we analyze the reasons. Many of us have seen subjects with simple conditions prohibited from raising the head from the bed, who in the course of a comparatively short time became so weakened that it was weeks before recuperation was completed. Perchance for a slight ailment which should have required no confinement or at least the very shortest, this factor of weakness apart from complications has demanded valuable time of the patient.

There are those, however, who cannot divorce themselves from the methods fitting to the early days of modern surgery. Especially in the period of antiseptic technic infection was not uncommon nor was it unexpected in many cases where it would be considered an evidence of a gross error in the aseptic method of to-day. In these instances and in others where drainage, which now we find infrequently required, was instituted, *fear of a weak wound or interference with peritoneal repair and the presence of fever* led to a variety of after treatment for which reasons no longer exist. *Pain* also in the past was a much more serious factor than at present since by uniform and gentle methods of operating and the elimination of unnecessary procedures less trauma is done the tissues and convalescence is more comfortable.

An incision that is improper or wound that becomes infected may demand rest to insure a strong scar. However, with the avoidance of infection, of nerve and muscle traumatism and division, and the use of incisions based upon anatomical lines (Fig. 1) there will no longer result weak abdominal walls and patients will be enabled safely to leave their beds, certainly by the fifth day. Even in herniotomy in so far as the patient is immediately propped up, although detained in bed somewhat longer than usual, it is seldom necessary to vary from a similar plan. This is fortunate if we can admit that danger of embolism, many cases of which have occurred in this type of operation, is thus avoided.

There are rarely serious objections upon the patient's part and as they are made more comfortable and feel better when propped up, the slight forebodings that may exist are readily overcome.

The great advantages to be obtained are the early recuperation of the patient, a lessened liability to infection, the avoidance of thrombosis, embolism and pulmonary complications, a diminished mal-effect upon the nervous system, a better performance of the physiological processes of digestion, assimilation and excretion, increased aeration of the blood and proper functional activity of liver and kidneys. Special note indeed should be made of the spontaneous bowel and bladder evacuations which rapidly follow early rising, thereby leading to a marked improvement in the patient's condition, as well as preventing the tendency to cystitis originating in catheterization or other-

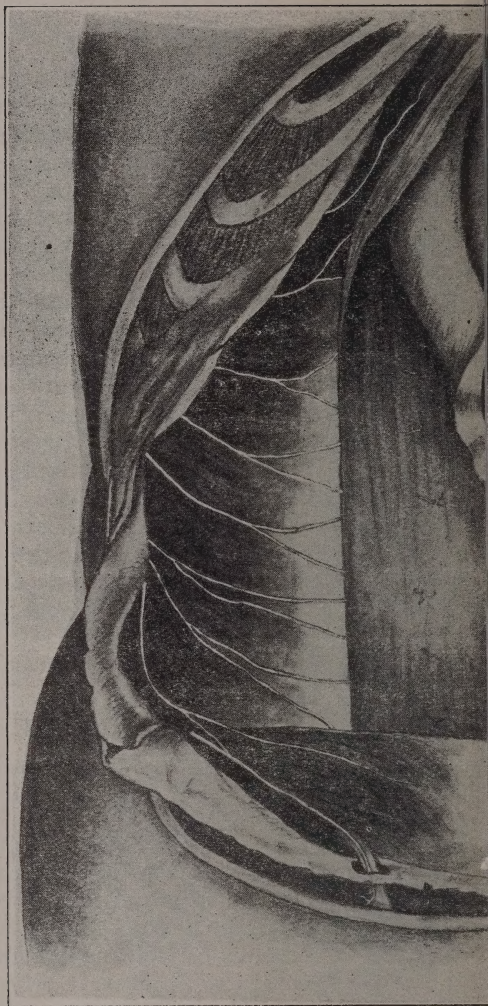
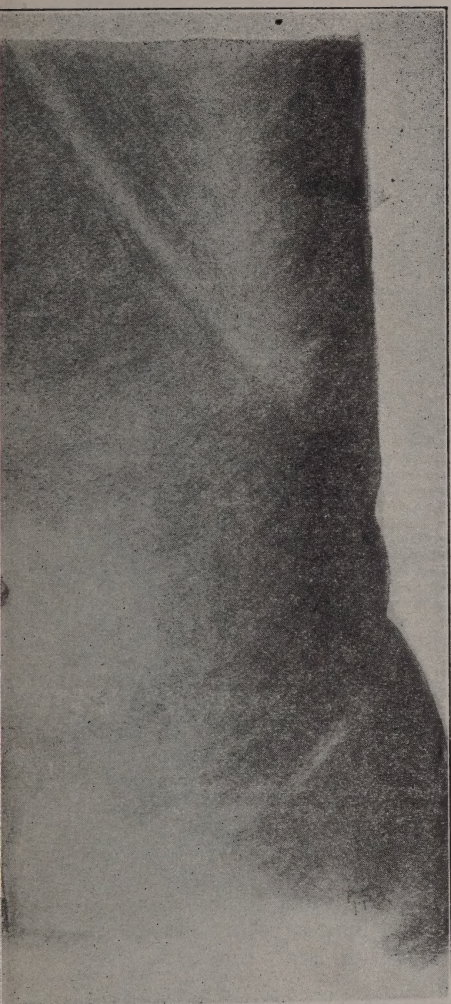


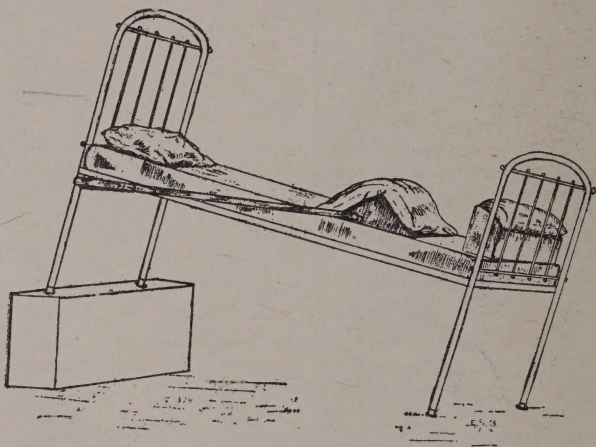
FIG. 1.—Nerves showing from above down
ileo-hypogastric and ileo-inguinal. Upper ner
rectus abdominis muscle. Lower two lie upo



6th, 7th, 8th, 9th, 10th, 11th, 12th dorsal,
lie upon transversalis and pass beneath
internal oblique muscle.

wise and ileus or irregular habits of bowel movements.

Some precautions are advisable in the early supplanting of the prone by the sitting or upright posture. In the case of abdominal operations the wound is covered with a not too voluminous dressing but one large enough to give even pressure over the abdominal wall when strapped down. Two pieces of adhesive,



four inches in width, are applied to keep the dressing in place and together with a snug abdominal binder to prevent undue tension upon the suture line. The patient is returned to a bed which is raised at the head ten to twenty inches from the floor (Fig. 2), where he lies quietly until well out of the anesthetic. To prevent slipping down in bed, a bolster beneath the thighs and fastened at each end

to the head of the bed, together with a suitable box arrangement put at the lower end of the bed for pressure of the feet to be made against, are used. As soon as out of the anesthetic and able to help himself he is permitted with assistance to turn upon his side and induced to move legs, arms, and to breathe deeply, thus assisting oxygenation, the pulmonary circulation, the venous flow to the heart and the more complete emptying of the latter during its systole. The day following operation he reclines in the raised bed upon two or three pillows; the second or third day, according to his feelings, he sits upright; by the fourth the legs are put out of bed and pressure made upon the floor; upon the fifth he can be in a chair and take a few steps; on the sixth strength is rapidly returning and more freedom is permissible. Sex is an unimportant consideration in this treatment and many patients go home upon the sixth or seventh day, and there are few laparotomized individuals, except those cachetic and cancerous or those extremely weakened and emaciated by disease or hemorrhage, who may not leave by the eighth day. With the latter class moreover it is equally important to follow a similar regime, especially as regards avoiding the prone posture if serious complications are to be eliminated.

At the earliest possible moment these patients are fed meat broths, excess of farinaceous food and of milk being prohibited. Drugs are seldom necessary. Rectal saline enemata or the Murphy drop method are extremely serviceable and advisable in a large percentage of all laparotomies. In addition every means is taken to

stimulate the cutaneous circulation by bathing, massage and alcohol rubs, thereby toning up the vasomotor mechanism and assisting both venous and arterial flow. Venous stasis in the extremities is prevented in like manner and thereby the accumulation of toxins of a debilitating and paralyzing nature obviated.

The classification of surgical work according to the feasibility of carrying out the after treatment as described leads to a separation of operations into two large classes; the one demanding a short rest in bed on account of weakened wound, peritoneal complications, fever or pain; the other where these indications for rest do not exist or are subordinate to other conditions demanding early rising.

There are few operative procedures longer classed among the former but in general they may be said to be severely infected cases, acute abdominal conditions with pus formation demanding drainage, and some plastic surgery including a few herniotomies. But here also long periods of rest are avoided and the patient is in a reclining position, if not immediately after operation, at an early date.

The second class consists of three subdivisions. A. Those operative procedures which require for the repair of the peritoneum and prevention of excessive adhesions some forty-eight to seventy-two hours of comparative rest, during which passive exercise and moderate voluntary movements are used and thereafter more active ones are positively indicated. In this group are 95 per cent of abdominal operations performed, the remainder belonging to class one. Division B includes those procedures in which the peritoneum, either

parietal or visceral, does not enter into consideration, strength of the wound and its proper healing is not endangered, debilitating pain is absent and in which no confinement is required: Here we find nine-tenths and more of the rectal operations for hemorrhoids, fissure, fistula, simple prolapse, many abscesses, malformations, division or divulsion of the sphincter muscle for constipation or painful affection and in fact all other conditions where the patient is not septic nor cachetic and where the operation can be performed in a painless manner, under local anesthesia, as is possible in practically all of these cases. Here also are classed minor operations elsewhere as well as major ones where long anesthesia, pain, and infection are avoidable and the physical and mental condition of the patient does not prohibit his being up and around. In division C are the cases where in spite of the presence of one of the contraindications to this method of post-operative treatment, it is wise to prop the patient up immediately after operation. In the aged and those with emphysema, chronic bronchitis or inefficient respiratory action from any cause, circulatory disturbance or other affection tending toward hypostatic engorgement in vital organs, it is essential to avoid the prone position.

There are also a number of operations preferably done in two stages, such as certain cases of excision of the rectum for malignancy after preliminary colostomy to divert the fecal current and by observation at the time of the first operation to define the extent of the trouble; pylorotomy with preliminary gastroenterostomy, and others, where rapid conval-

escence and as little physical impairment as possible demand this more logical method of post-operative treatment.

Hernia in these cases has never occurred in my practice, nor do that I believe it a probability where infection is absent, and nerve injury is avoided. On the other hand simple intermuscular incisions for appendectomy with injury or inflammation of the ileo-hypogastric nerve, which may by communication below make up the larger part of the ileo-inguinal, has led to right inguinal hernia, a circumstance that is not fully appreciated. The relation of the latter nerve to the inguinal canal and its supply to the internal oblique muscle and conjoined tendon (Fig. 1) readily accounts for the sequelæ.

The separation of muscle fibres is not markedly weakening to the abdominal wall, the fibres running parallel and contraction of them tending to increase their coaptation to each other and make more difficult any protrusion between them. Moreover during the past five years the transverse abdominal incision (Pfannenstiel's) has been to a large extent used by me in laparotomies and in the several hundred cases where the belly wall has been thus divided, as far as I can determine, no weakness in it nor hernial protrusion has ensued. It is ideal as regards simplicity, rapidity, strength of repair, absence of blood vessel, nerve and muscle injury, exposure of underlying parts and to a less extent for drainage, when required, and has in short everything to commend it and no very objectionable features.

We can fairly state that operative technic is nearing perfection but pre- and post-oper-

ative measures have to some extent been neglected, hindering thereby the attainment of results which should with confidence be expected with our present knowledge and methods.

Finally experience with this form of after treatment convinces me, avoidable and dangerous complications will be, like infection, largely prevented, thereby obviating the dread of necessary operative procedures which now exists in many cases for the conscientious physician, who realizes it is not as frequently the operation *per se* as the sequelæ that are to be feared. In addition much valuable time will be saved your cases, weary confinement to bed avoided, a more satisfactory convalescence obtained and there will exist fewer late results disastrous for the patient and discreditable to surgery.

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